



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,422	09/29/2000	Akira Yamaguchi	09792909-0431	3868

7590 09/11/2003

Sonnenschein, Nath & Rosenthal  
P.O. Box # 061080  
Wacker Drive Station, Sears Tower  
Chicago, IL 60606

[REDACTED] EXAMINER

TSANG FOSTER, SUSY N

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

1745

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/675,422	YAMAGUCHI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Susy N Tsang-Foster	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 10 March 2003 and 15 July 2003.
- 2a) This action is FINAL.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-3 and 5-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-3 and 5-27 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 10, 2003 has been entered.

### ***Response to Amendment***

2. This Office Action is responsive to the amendment filed on March 10, 2003. Claims 1, 13, and 22 have been amended. Claims 1-3, and 5-27 are pending. Although applicant remarks that claim 16 has been cancelled, claim 16 is still pending because it has not been formally cancelled in the amendment. The only formal amendments made to the claims are amendments to claims 1, 13, and 22 in the amendment filed on March 10, 2003. Art rejections based on JP 08-287952 A have been withdrawn in view of applicant's amendment. Claims 1-3, and 5-27 are rejected for reasons given below.

### ***Claim Objections***

3. Claim 16 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the

Art Unit: 1745

claim(s) in independent form. Claim 16 contains the same exact limitations as claim 14 from which it depends. It is noted that the limitation "wherein the ratio by weight of the carbon fibers to the carbon flakes in the negative electrode is in a range of 0.2 to 100" recited in claim 16 has been incorporated into claim 13.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, and 5-27 are rejected under 35 U.S.C. 102(e) as being clearly by anticipated by Kaneda et al. (US 2003/0129494 A1).

See Figure 2 and paragraphs 40-44, 86-89, and 96-98 of the reference.

6. Claims 1-3, 5, and 13-18 are rejected under 35 U.S.C. 102(b) as being anticipated by the IPDL JPO machine translation for JP 09-027344 A and as evidenced by the Derwent abstract for JP 09-027344 A.

The IPDL JPO Machine translation for JP 09-027344 A discloses a nonaqueous electrolyte secondary battery comprising a positive electrode and a negative electrode and adding 3 to 16 wt% of carbon flakes and carbon fibers to the positive electrode of a lithium battery with the mixing ratio of carbon flakes to carbon fibers of 85:15 to 25:75 which would be a ratio by weight of .25 to 5.66 carbon fibers to carbon flakes (see abstract). Calculations would indicate that this would be approximately .75 wt% of carbon flakes to 13.6wt% carbon flakes and .45 wt% carbon fiber to 12 weight percent carbon fiber in the positive electrode. JP 09-027344 A also discloses carbon fibers with the trademark name VCGF by Showa Denko KK and carbon flakes with the trademark name KS-15 are used in the positive electrode (see paragraph 121 of machine translation).

Since the carbon fibers and carbon flakes used in JP 09-027344 have the same trademark names as those used by applicants, the carbon fibers and carbon flakes of JP 09-027344 are expected to have the properties (such as diameter, length, and thickness) recited in the present claims.

It is noted that the term "positive electrode" and "negative electrode" are relative terms depending on whether the battery is charging or discharging. As evidenced by the Derwent abstract for JP 09-027344 A, the positive electrode comprising a mixture of flake shape and fibre shape carbon materials is called the anode (the negative electrode) and the carbon containing electrode is referred to as the cathode. Thus, the reference of JP 09-027344 A discloses a battery during the charging mode, a negative electrode comprising carbon fibers and carbon flakes

Art Unit: 1745

disposed in the interstices between the particulate electrode active material. During charging and discharging of a battery, the polarities of the electrodes are reversed.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 5, 6, 9-19, and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0871233 A1 in view of JP 09-027344 A.

EP 0871233 A1 discloses a nonaqueous electrolyte secondary battery comprising a positive electrode comprising a positive-electrode active material capable of intercalating/deintercalating lithium; a negative electrode comprising a negative electrode active material capable of intercalating/deintercalating lithium and a nonaqueous electrolyte solution wherein the negative electrode further comprises carbon flakes (trademark name KS-15 from Lonza Ltd, see for example, page 21, line 15-20 ) and carbon granules (see page 23, lines 15-23, lines 30-35, lines 39-50, lines 55-58; page 24, lines 1).

The positive electrode active material can be a lithium transition metal oxide given by the general expression  $\text{LiMO}_2$  where M is at least one element selected from the group consisting of Co, Ni, Mn, Fe, Al, V and Ti (page 23, lines 47-50) and the negative electrode may be a lithium metal oxide or graphite (page 5, lines 17-20; page 9, lines 15-25; page 24, line 1). Specifically,

Art Unit: 1745

the negative electrode active material may be carbon material that has been carbonized and has been crushed or milled which would provide a particulate negative electrode active material (page 5, lines 54-58). The negative electrode active material may also be a graphite powder which is particulate (page 6, lines 28-50 and page 17, lines 10-46). The negative electrode active material may also be crushed lithium titanium oxide (page 9, lines 20-25).

The electrolyte solution in the battery may be a mixture of ethylene carbonate and dimethyl carbonate comprising LiPF<sub>6</sub> as the electrolyte salt (page 8, lines 5-26; page 9, lines 50-55). Generally, the binder PVDF is used in the electrode of a lithium battery (page 9, lines 15-25).

EP 0871233 A1 does not disclose that the negative electrode comprises carbon flakes and carbon fibers.

JP 09-027344 A teaches adding 3 to 16 wt% of carbon flakes and carbon fibers to the positive electrode of a lithium battery comprising a lithium transition metal oxide expressed with LiMO<sub>2</sub> where M is at least one of Co, Ni, Mn, Fe, Al, V, and Ti) with the mixing ratio of carbon flakes to carbon fibers of 85:15 to 25:75 which would be a ratio by weight of .25 to 5.66 carbon fibers to carbon flakes (see abstract and paragraph 21 of machine translation). Calculations would indicate that this would be approximately .75 wt% of carbon flakes to 13.6wt% carbon flakes and .45 wt% carbon fiber to 12 weight percent carbon fiber in the positive electrode. JP 09-027344 A also teaches carbon fibers with the trademark name VCGF by Showa Denko KK and carbon flakes with the trademark name KS-15 are used in the positive electrode (see paragraph 121 of machine translation).

Art Unit: 1745

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the carbon granules in EP 0871233 A1 with the carbon fibers of JP 09-027344 because they both serve the same purpose of maintaining the structural integrity of the electrode during the charge/discharge cycle as taught by JP 09-027344 in paragraph 19 (see machine translation) and by EP 0871233 A1 on page 5, lines 4-8. Since the carbon fibers used in JP 09-027344 has the same trademark name as that used by applicants, and the carbon flakes used in EP 0871233 A1 has the same trademark name as that used by applicants, the carbon fibers of JP 09-027344 and the carbon flakes of EP 0871233 A1 are expected to have the properties (such as diameter, length, and thickness) cited in the claims.

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to use 3 to 16 wt% of carbon flakes and carbon fibers with the mixing ratio of carbon flakes to carbon fibers of 85:15 to 25:75 in the negative electrode of EP 0871233 A1 because this proportion would given sufficient conductivity and structural strength to the electrode as taught by JP 09-027344 in paragraph 51 (see machine translation). Furthermore, EP 0871233 A1 disclose that the total amount of conductive agent (carbon flakes and carbon granules) in the negative electrode is 2 to 15% by weight (page 5, lines 1-3) and that the preferred mixing ratio between carbon flakes and granulated carbon is 90:10 to 20:80, which are nearly identical to the range of 3 to 16 wt % of the total conductive agent (carbon flakes and carbon fiber) and weight ratio of 85:15 to 25:75 (carbon flakes to carbon fibers) taught in JP 09-027344.

Art Unit: 1745

***Response to Arguments***

9. Applicant's arguments filed March 10, 2003 have been fully considered but they are not persuasive.

*With respect to art rejections based on EP 0871233 A1, applicant's central argument appears to be that the conductive materials used to form a positive electrode and a negative electrode are very different materials, LiMO<sub>2</sub> versus particulate carbon.*

In response, EP 0871233 A1 discloses that the negative electrode material can be carbon material such as graphite and a metal oxide which can carry out the doping and dedoping of lithium (see page 5, lines 16-20) and titanium oxide and lithium titanium oxide (see page 21, lines 9-12 and page 9, lines 15-25) are given as specific examples of metal oxide negative electrode materials. The JP 09-027344 A appears to be teaching away from adding carbon fibers and carbon flakes when the negative electrode comprises graphite as the active material but the present claims are not limited to graphite as the negative electrode material.

***Conclusion***

Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Friday from 9:30 AM to 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/ *Susy Tsang - Foster*

Susy Tsang-Foster  
Primary Examiner  
Art Unit 1745